

ABSTRACT

A fabric and tape laying machine operable with: (a) a robot including programmable control means, (b) a supply roll containing a continuous strip of composite tape or fabric, and (c) a mold, plug or mandrel of predetermined surface shape relative to x, y and z coordinates, including:

- 5 a. a chassis mountable to the robot and movable by the robot for laying the tape or fabric onto the mold along a programmed path that is straight with respect to the x and y coordinates and follows contours of the predetermined surface shape with respect to the z coordinate,
- 10 b. means on the chassis for supporting the supply roll,
- c. a contact roller module mounted on the chassis and spaced apart and downstream from the supply roll and adapted to receive the tape from the supply roll, the contact roller module being carried by the chassis as the chassis is moved along the programmed path,
- 15 d. a tape cutting unit carried by the chassis and situated between the supply roll and the contact roller module,
- e. a first set of feed rollers downstream of the supply roll and upstream of the tape cutting unit, and a second set of feed rollers downstream of the tape cutting unit and upstream of the contact roller module for driving the tape
- 20 f. from the supply roll and maintaining the tape taut while it passes through the tape cutting unit, and driving the tape to the contact roller module, the tape extending from the supply roll to the tape-cutting unit having opposite generally parallel side edges,
- 25 g. the tape-cutting unit including at least one cutter to cut a predetermined profile along one of the opposite sides of the tape as the tape is moving through the tape-cutting unit and/or to cut the tape transversely to have a predetermined length when it covers a predetermined surface area of the mold,
- 30 h. the contact roller module including at least one modular frame, a set of three pressure contact rollers carried by at least one the frame,
- i. namely a center roller and two side rollers in end-to-end relationships, the at least one set of pressure contact rollers adapted to have the tape received from the tape-

cutting unit pass around the pressure contact rollers and be laid onto the mold, and where each of the side rollers has its central axis angularly displaceable relative to the central axis of the central roller, and

- h. a suspension system for dynamically energizing the contact roller module to have its rollers apply a predetermined level of force downward on the tape during the lay-up process regardless of any varying contours on the mold surface.